Correlation between longevity of participation, and well-being of those in the Arthritis Foundation's Aquatic Program

An Undergraduate Honors Thesis

Kyle W. Dorsey

Geriatrics and Gerontology, School of Allied Medical Professionals

Advisor: Jill E. Clutter PhD, CHES

Georgianna Sergakis PhD, RRT

May 18, 2007

Abstract

Correlation between longevity of participation, and well-being of those in the Arthritis Foundation's Aquatic Program

Kyle W. Dorsey, Jill E. Clutter PhD, CHES Georgianna Sergakis PhD, RRT

Background: Arthritis is the leading cause of disability in the United States, and its prevalence is expected to increase as the U.S. population ages. With the aging of the baby boomers, the number of individuals affected and the associated disabilities will quickly escalate. While arthritis treatments are often measured in terms of physical outcomes, psychosocial benefits and perceived benefits may be manifested as well.
Objective: The purpose of this study is to examine the Arthritis Foundation's Aquatic Program for its psychosocial benefits and perceived benefits in correlation with longevity of participation. Acquiring such information will not only help solicit the program to those not currently involved, but also help continue to improve the overall quality of life of the current enrollees.
Methods: This study analyzes the psychosocial aspects of the Arthritis Foundation's Aquatic Program through the use of the SF-12 Health Survey. The surveys were personally distributed to the participants in the Arthritis Foundation's Aquatic Program that were randomly selected. Data was entered into the Statistical Package for the Social Sciences (SPSS, Version 15.) for compilation and analyses. A descriptive data analysis was used to answer the research questions.
Conclusions: The data explains the relationship between the longevity of participation and the attitudes of the participants; the likelihood the participants who are enrolled to continue their commitment to the program, and the perceived benefits of the participants in the Arthritis Foundation's Aquatic Program. No relationship was found between longevity of participation and the attitudes and perceived benefits of the participants in the Arthritis Foundation's Aquatic Program. Although this statistic is true, it is likely that those who are enrolled in the program will continue to maintain their attendance in the program.

Problem Statement

The word arthritis literally means joint inflammation, but it is often used to refer to a group of more than one hundred rheumatic diseases that can cause pain, stiffness, and swelling in the joints. Arthritis is the leading cause of disability in the United States[1], and its prevalence is expected to increase as the U.S. population ages[2]. The disease burdens caused by arthritis in the United States are already enormous[3]. Arthritis and other rheumatic conditions are a major health problem in the United States, affecting 15% of the population (43 million persons) in 1990 and a projected 18.2% (60 million persons) by 2020[4]. With the aging of the baby boomers these numbers and the associated disabilities will quickly escalate[5].

The aging of the population and the increasing prevalence of arthritis makes it more important than ever to raise awareness of the growing impact of arthritis and other rheumatic conditions and available interventions to decrease symptoms and increase function[6]. Arthritis often leads to increased inactivity that result in reduced joint mobility, strength, fitness, exercise participation, and risk for development of coronary heart disease[7]. Arthritis is a leading cause of chronic pain; it is associated with a variety of health problems such as obesity, physical inactivity, and gastrointestinal bleeding related to use of non steroidal anti-inflammatory drugs[8]. In a very real sense arthritis greatly affects the quality of lives as surely as do heart disease and cancer[3]. People with arthritis are substantial users of health care services, averaging 9-10 physician visits and 0.2-0.3 hospital admissions annually[5].

Arthritis does not only affect the elderly population as many people think. Arthritis influences people in all age groups including nearly 300,000 children. More than 60% of people who have arthritis are below the age of 65. Arthritis is the most prevalent and disabling condition for women[9] and is the main cause for limitation of activity for women over 45. More than 60% of persons with arthritis have limited physical activity to some extent[10].

In 1997, the total cost of arthritis and other rheumatic conditions in the United States was 86.2 billion (including $51.1 billion in direct costs and $35.1 billion in indirect costs), approximately 1% of the U.S. gross domestic product[11]. Estimation of indirect costs reported consistently included loss of productivity, and most used lifetime costs to account for lost productivity due to premature death[5].

It is well known that there are high economic and social costs related to the high prevalence of disability associated with arthritis[12]. Arthritis and rheumatic conditions (i.e., arthritis) are responsible for major health care expenditures and disability burdens[5]. In 1990, the major life activities (work, school, home) of 7 million people were limited by these conditions, and projected figures indicate that 11.6 million will be limited in 2020[6]. Work loss, restricted to labor force participants, averaged almost 1 day over 2 weeks among all persons with arthritis[5]. Given its rapidly increasing prevalence due to growing numbers of older adults, future economic costs due to arthritis are only poised to accelerate[5].

Arthritis education and exercise/physical activity programs slow down or reduce long-term impairments and disabilities, reduce pain, and help people adjust to their condition[6]. Exercise could provide an absolute reduction of 5-10% in the progression of

functional deterioration among older adults with arthritis[5]. Disability reduction or prevention programs for people with arthritis and other rheumatic conditions reduce long-term pain and disability but reach only a fraction of their targeted audiance[6]. Because of the apparent efficacy of these interventions, clinical and public health practitioners are recommending participation in exercise or physical activity and self-management education programs for people with arthritis[6].

Chronic diseases are known to have adverse effects on the psychological well–being of individuals[14]. One common effect is being depressed because of the sense of helplessness. Having many diffuse social relationships and receiving emotional support seem to mitigate the influence of arthritis on depressive symptoms[15]. With no cure for chronic diseases, it is important to identify whether and how coping resources intervene between disease status and psychological adjustment[15].

Arthritis is primarily a quality-of-life issue because it is usually nonfatal and incorrectly viewed as being an inevitable part of aging, affecting only older people and having no effective treatment[6]. People who exercise regularly live longer and are healthier than those who are sedentary[13]. The general health benefits of physical activity are well known; many recent studies have demonstrated the positive effects of physical activity on person with arthritis[16]. Since 1975, study results have consistently indicated that moderate-intensity aerobic exercise is safe, physically, and psychologically beneficial for people with arthritis[13]. On average, 12.4% of medical costs of inactive persons was associated with physical inactivity[4].

Experts now recognize that physical activity is an important element in the prevention and management of disability due to arthritis, and they recommend that

physical activity be include in the overall treatment of patients with osteoarthritis, rheumatoid arthritis, and ankylosing spondylitis[6]. Patients with more feelings of mastery and higher perceived self-efficacy have fewer depressive symptoms than persons with lower levels of these resources[15].

The purpose of this study is to analyze the psychosocial aspects of the arthritis foundations aquatic program through the use of the SF-12 Health Survey. Since the arthritis foundation exercise program was founded in 1987, many studies have been conducted to measure the physical benefits of the program, but very few studies have been conducted to measure the psychosocial benefits of the program. It is understood that the community-based program works, thus improving the participant's perception of their arthritis; however, it is not understood why this is so. Additionally, there is very little if any understanding of why the individuals who are involved with this program continue to return to the program time after time. The objective of this study is to acquire such information in order to not only help solicit the program to those not currently involved but also to help continue to improve the quality of life of the current enrollees.

Related Research

As previously indicated, while there is very little information on the psychosocial and psychological benefits of aquatic exercise for persons with arthritis, there are several studies related to this area in the literature. Most of these studies describe the relative benefits of such exercise in terms of physical activity, mobility, and pain management.

A study was conducted by Brady et al[6] in 2003 to review and describe packaged (ready-to-use) arthritis self-management education and exercise/physical activity programs that have had at least a preliminary evaluation. In a quasi-experimental pilot study that used a nonrandomized comparison group, Arthritis Foundation Aquatic Program participants showed significant improvements at 4 months in pain and ability to perform activities of daily living[17]. A small, randomized, controlled trial of the Arthritis Foundation's Aquatic Program found significant changes in range of motion and muscle strength[18]. Patrick et al.[19] demonstrated improved functional status and perceived quality of life, as well as reduction in physician visits among aquatic program participants. Those attending the program twice per week (29% of the 125-member experimental group) had significantly higher quality-of-life and functional status scores than those who didn't exercise and those that showed up less than twice a week.

A study was conducted by Michele L. Boutaugh[20] to evaluate both the effectiveness and the implementation issues of the arthritis foundation community-based physical activity programs. In the study, he found that safety and efficacy of both aquatic therapy and land-based exercise programs for people with arthritis have been established through multiple controlled experimental studies. Participants in clinical trials have

demonstrated improvements in such outcomes as pain, morning stiffness, tender joint counts, muscular strength, cardiovascular fitness, and mood.

A small pilot study done by the Arthritis Foundations Aquatic Program (AFAP) utilized a pretest-posttest design to show significant improvements in pain and functional status at 4 months (Arthritis Foundation, unpublished data). A small, randomized, controlled trail of AFAP with women with arthritis demonstrated significant positive changes in joint range of motion and muscle strength[21]. In the cost-effectiveness study by Patrick et al[19], 249 men and women with osteoarthritis (OA) were randomized into a delayed treatment control group or a treatment group that was asked to attend at least 2 aquatics classes per week for 20 weeks. Using data obtained from weekly diaries and questionnaires, participants in the AFAP had fewer physician visits and better than or equal quality of well being when in comparison to before using the aquatic program. After completing a session of classes, participants had a better functional status and perceived quality of life. Of this treatment group, those adhering to the minimum attendance of 2 classes per week (29%) had significantly higher quality of life and functional status. Although direct medical care costs did decrease slightly in the treatment group, these savings were offset by the program costs. Those costs not only included the expense of recruitment but also what participants paid for in registration fees, transportation costs, and the value of their time associated with participation in the exercise class.

A study was conducted by Schoster et al[22] to do a qualitative evaluation of participant satisfaction of the People with Arthritis Can Exercise (PACE) program. It found that of the 51 participants interviewed, 96% were female, with an average age in

years of 67 (range, 32-90 years). Participants reported deriving considerable social support form exercising in a group with others who have arthritis. They identified two main factors that motivated them to continue participating in the exercise class: ability to work at their own pace during the class and confidence that they could do different kinds of exercise safely. Participants also reported that their instructor played a vital role in sustaining their motivation to exercise. Among the participants, those that did not complete the program reported arthritis related illness or insufficient physical challenge as key barriers to class participation.

A study was conducted by the Centers of Disease Control and Prevention (CDC) on the prevalence of doctor-diagnosed arthritis and possible arthritis. The findings in the research report were the first state-specific estimates of doctor-diagnosed arthritis effects using the new BRFSS module. BRFSS is a (CDC) coordinated, State-based, telephone-administered health survey that continuously monitors risk behaviors related to chronic diseases, injuries, and death. The questions focus on health behaviors related to several leading causes of death and disease[8].

The CDC found that doctor-diagnosed arthritis affects a median of 27.6% of adults in thirty states and occurs more frequently among women and older adults. An additional median of 17.3% of adults had possible arthritis. Person with doctor-diagnosed arthritis tend to report more activity limitation and likely have more severe symptoms than those with possible arthritis. Unlike doctor-diagnosed arthritis, possible arthritis occurred more frequently among men and adults aged <65 years[11].

A study was conducted by Dorothy et al[5] to evaluate the costs of arthritis. This literature from national studies on the costs of arthritis documents an affliction of great

magnitude, showing that arthritis exacts substantial national tolls. Economic costs of arthritis represent 1.5-2.5% of the GNP and total health care expenditures among those with arthritis approach 3% of the GNP. People with arthritis are substantial users of health care services, annually averaging 9-10 physician visits and 0.2-0.3 hospital admissions. In the U.S. alone, it was the primary listed diagnosis for 44 million ambulatory visits and 3.8 million hospital days in 1997. Finally, people with arthritis experience significant time loss; more than half of these limitations were experienced with work disabilities and as many as 60% with activity limitations attributable to arthritis.

In a study conducted by Rejeski and Mihalko[23] on physical activity and quality life in older adults, the authors found the importance of examining quality of life from a theoretical perspective. If research in this area is to move beyond basic descriptive associations between activity and the many indicators of quality living, future research must incorporate these indicators into a conceptually practical and meaningful framework. Adapting an operational definition of this outcome that relates to one's perception of satisfaction with valued domains of life is preferred for at least two reasons. First, elevating quality of life to the level of psychological construct will facilitate the development of theory and promote the examination of potential mechanisms that may underlie the relationship between physical activity and enhanced quality of life in older adults. Second, a more comprehensive examination of both mediating and moderating variables will have significant implications in the design, implementation, and promotion of physical activity programs. In doing so, programs will help to fill an important need in

public health echoed by The Gerontological Society of America's motto "adding life to years, not just more years to life!"

Objectives of the Study

The purpose of this study was to examine the Arthritis Foundation's Aquatic Program for variables other than those attributed to physical benefits. Several studies have already indicated that there are many physical benefits related to the Arthritis Foundation's Aquatic Program. The benefits being studied here were the attitudes of the participants, the likelihood of the participants to continue with the arthritis classes, and the participants perceived benefits from the classes. The mission behind doing this study was to discover what keeps those who are currently enrolled in the program continually using the program. From this study, a conclusion may be drawn on how to attract others with arthritis to the program, which will help to eliminate the effects of arthritis on a much larger population.

The data that was collected from the Arthritis Foundation Aquatic Program in Franklin County were sufficient enough for a pilot study. This analysis will help to form the initiation for a national evaluation effort. Since arthritis is the number one disease for causing disability, a study of this nature is much needed to evaluate the reliability effort of those suffering with arthritis.

After completing research and brainstorming about the arthritis foundations aquatic program, it was discovered that there was not one underlying question needing to be answered; instead there were several. From this intense list, four questions were compiled to be the basis of this research project.

Research Questions:

1. What are the attitudes of the participants who utilize the Arthritis Foundation's Aquatic Program?

2. How likely are the participants who are enrolled in the Arthritis Foundation's Aquatic Program to continue with their commitment to the program?

3. What are the perceived benefits gained by the participants in the Arthritis Foundation's Aquatic Program?

4. What is the relationship between the longevity of participation and the attitudes and perceived benefits of participants in the Arthritis Foundation's Aquatic Program?

5.

   a. H_o: There is no relationship between the longevity of participation and the attitudes of the participants who utilize the Arthritis Foundation's Aquatic Program.

   b. H_o: There is no relationship between the longevity of participation and the likelihood of participants who are enrolled in the Arthritis Foundation's Aquatic Program to continue with their commitment to the program.

   c. H_o: There is no relationship between the longevity of participation and perceived benefits gained by the participants in the Arthritis Foundation's Aquatic Program.

RESEARCH QUESTION	TYPE OF VARIABLE	STATISTICAL ANALYSIS
1. What are the attitudes of the participants who utilize the Arthritis Foundation's Aquatic Program?	SF-12v2 Health and Well-Being (Q 1, 4, 5)	Frequency, Percent
2. How likely are the participants who are enrolled in the Arthritis Foundation's Aquatic Program to continue with their commitment to the program?	SF-12v2 Health and Well-Being (Q 2, 3, 7)	Frequency, Percent
3. What are the perceived benefits gained by the participants in the Arthritis Foundation's Aquatic Program?	SF-12v2 Health and Well-Being (Q 6)	Frequency, Percent
4. What is the relationship between the longevity of	SF-12v2 Health and Well-Being (Q 1, 2, 3, 4, 5, 6,	Spearman, Rho (ρ)

participation and the attitudes and perceived benefits of participants in the Arthritis Foundation's Aquatic Program?	7) Demographic Review	
a. H_o: There is no relationship between the longevity of participation and the attitudes of the participants who utilize the Arthritis Foundation's Aquatic Program.	SF-12v2 Health and Well-Being (Q 1, 4, 5) Demographic Review	Spearman, Rho (ρ)
b. H_o: There is no relationship between the longevity of participation and the likelihood of participants who are enrolled in the Arthritis Foundation's Aquatic Program to continue with their commitment to the program.	SF-12v2 Health and Well-Being (Q 2, 3, 7) Demographic Review	Spearman, Rho (ρ)
c. H_o: There is not relationship between the longevity of participation and perceived benefits gained by the participants in the Arthritis Foundation's Aquatic Program.	SF-12v2 Health and Well-Being (Q 6) Demographic Review	Spearman, Rho (ρ)

Procedures

Population and Sample

The arthritis foundation developed the arthritis foundation exercise program in 1987. The program was then revised in 1999. The Arthritis Foundation's Aquatic Program is a community based program that focuses on recreational exercise. Within the arthritis foundation exercise program, there are two different levels of classes, advanced and basic. The advanced level class focuses more on aerobic activity, while the basic level class focuses on low impact activities.

This focused on the latter of the two groups. All the instructors that teach these classes have gone through a 12-hour training workshop, many who also have a background in healthcare and/or fitness. The instructors pick from an array of 72 different exercises to teach during their class. These activities target endurance strengthening through socialized games, relaxation techniques, and health education.

It is estimated that there are over 1,000 participants in the Arthritis Foundation's Aquatic Program in Franklin County. In order to ensure representativeness of the population, a sample of 300 was deemed sufficient[24]. Due to the format of the aquatic program, it was be most judicious to use a class as the sampling unit. Therefore, a sufficient number of classes were selected from the arthritis foundation's roster to obtain the desired sample size. This type of sampling is called cluster sampling. Cluster sampling is sampling in which groups, not individuals are randomly select[25]. The individuals within a class constitute a cluster insofar as they are alike with respect to characteristics relevant to the variables of the study[26]. Just as simple random sampling is

more effective with larger numbers of individuals, so, too, is cluster random sampling more effective with larger numbers of clusters[27].

The individual investigator was responsible for administering the surveys to the participants. This format was to eliminate administration error and to conclude with the most viable results. In order to draw the cluster random sample, coordination was done with the director of the arthritis foundation in Franklin County. With cluster sampling, the investigator begins with large units, or clusters, in which smaller sampling units are contained[28]. This technique allows the investigator to draw a random sample without a complete listing of each individual or unit[28].

A copy of the CITI course Completion Record for the investigator can be found in Appendix A. Once the proposal was approved by the Honors and Research Committee it was sent in for Institutional Review Board (IRB) approval from The Ohio State University. With minor alterations, the protocol was approved as exempt by the Behavioral section of the IRB (# 2006E0826). With this process complete, data collection was begun.

Design

The research was accomplished using a non-experimental, descriptive research design

Instrument and Data Analysis

A form of the SF-12v2 Health and Well-Being Survey was used to assess the participants of the Arthritis Foundation's Aquatic Program in Franklin County. A copy of the SF-12v2 along with a demographic review can be found in Appendix B. The SF-12v2 is a multi-purpose, short-form health survey with only twelve questions. This

twelve-question survey generates an abbreviated health profile consisting of two summary measures describing health-related quality of life. It generally takes about three minutes to complete.

The SF-12v2 has been shown to yield summary physical and mental health outcome scores that are interchangeable with those from the SF-36 in both general and specific populations. It has been used extensively as a screening tool (SF-12 citation). Because of its brevity, it is frequently embedded into longer, condition-specific surveys. In this study the SF-12v2 was embedded into other questions that will better address the research questions.

There is considerable empirical evidence that the SF-12v2 five-choice response categories substantially improve the two SF-12 role functioning scales. The five-level v2 response categories adopted for the Role Physical (RP) and Role Emotional (RE) scales extend the range measured and greatly increase score precision without increasing respondent burden.

After receiving IRB approval, a letter was sent to the instructors of the classes that have been selected to be included in the random cluster sampling. This letter gave them the opportunity to have an understanding of what was going to occur over the next several months. Within this letter, the instructors were asked to give feedback on when the best time would be to give the survey. Also included with this letter was a copy of the survey that will be used (see appendix B). This sample gave the instructors the opportunity to become familiar with the material. Lastly, the initial letter was ensuring that the instructor will be compliant with implementing the survey.

After giving the instructors a few weeks to comprehend the survey, were given a confirmation date and time of when the investigator would administer the survey to their class. Data collection at the twelve participating classes took place over a 6 week period during winter of 2007. The researcher introduced himself in each class and explained the purpose of the survey questionnaire to potential participants. Those who were willing to participate were given a questionnaire and a pencil. The survey took each participant no more than five minutes to complete. The completed questionnaires were collected by the researcher and returned to the School of Allied Medical Professions where they were stored for data entry. Data were entered into the Statistical Package for the Social Sciences (SPSS, Version 15.0) for compilation and analyses. Descriptive data analyses were used to answer research questions numbers 1 through 3. The relationship in question 4 was analyzed with a correlation coefficient (Spearman's Rho).

Results

The research project received institutional review board (IRB) approval before any of the arthritis foundation aquatics program pools' were contacted, and the surveys were distributed to participants. Originally, twenty-eight facilities were identified, based on a listing supplied by the arthritis foundation. This list contained all the pools in Franklin County participating in the Arthritis Foundation's Aquatic Program. Twelve of them were contacted and their participants were surveyed. Of the remaining sixteen, twelve had no response to three separate phone calls, two were collaborating with another facility, and two were unable to be contacted due to disconnected phone numbers. Once a contact was established at each facility, a time was arranged to meet with them to distribute the survey questionnaires to the participants. From the twelve facilities, one hundred completed questionnaires were collected. Not every participant provided information on their demographics, and some did not answer all of the questions, so the response rate is reported for each question.

What are the attitudes of the participants who utilize the Arthritis Foundation's Aquatic Program?

The respondents were asked how they would rate their general health on a scale from excellent to poor (see table 1). A majority of participants rated that their health was good or better. Out of the ninety-three individuals that answered this question, not one of them reported that their health was poor.

n = 93	Frequency	Percent
Excellent	8	8.6
Very Good	17	18.3
Good	48	51.6
Fair	20	21.5
Poor	0	0.0

Table 1. In general, would you say your health is

The participants were asked two questions about how much of the time during the past four weeks they had any problems with their work or other regular daily activities as a result of emotional problems, primarily consisting of being depressed or anxious. The first question was in regards to the degree these emotional problems caused for the participant to accomplish less than they would like. A majority of the ninety-three respondents to this question reported that they only had emotional problems a little of the time (Table 2). Those who did suffer from this type of emotional distress were primarily only affected some of the time.

n = 93	Frequency	Percent
None of the time	37	39.8
A little of the time	26	28.0
Some of the time	18	19.4
Most of the time	10	10.8
All of the time	2	2.2

Table 2. Accomplish less than you would like

In conjunction with the first question, the participants were asked if they were limited in the kind of work and other activities they did as a result of emotional problems. The results were very similar to those in the previous question (Table 3). Nearly half of the ninety-three participants who answered this question were unaffected by emotional problems and were able to perform their work and other activities normally.

n = 93	Frequency	Percent
None of the time	43	46.2
A little of the time	19	20.4
Some of the time	20	21.5
Most of the time	9	9.7
All of the time	2	2.2

Table 3. Were limited in the kind of work or other activities

In relation to being physically affected, the participants were asked how much pain interfered with their normal work in the past 4 days. Work included both outside of

the home and housework. Overall, pain seemed to be a moderate issue for most of the participants (Table 4). When speaking with the instructors of the aquatics classes, it was made known that the participants were attending the classes to help manage their pain that was associated with their arthritis.

n = 93	Frequency	Percent
Not at all	9	9.7
A little bit	27	29.0
Moderately	33	35.5
Quite a bit	22	23.7
Extremely	2	2.2

Table 4. How much did pain interfere with your normal work

How likely are the participants who are enrolled in the Arthritis Foundation's Aquatic Program to continue with their commitment to the program?

Of the one hundred participants surveyed, their results of longevity of participation in the program varied. A majority of the participant have either been in the program for less than a year or they have been a part of the program for over five or more years (Table 5). The group that fell between one and five years was the smallest group represented.

n = 100	Frequency	Percent
2 months or less	11	11.0
3-6 months	15	15.0
7-11 months	3	3.0
1 year	8	8.0
2 years	14	14.0
3 years	14	14.0
4 years	9	9.0
5 years or more	26	26.0

Table 5. How long have you participated in the arthritis Foundation Program?

On average, the participants attended the arthritis foundation's aquatic classes two times a week. The participants would also, on average, exercise outside of the arthritis foundation's classes twice a week.

The participants were asked two questions regarding activities that they might encounter during a typical day. The first question asked the participants if their health was currently limiting their moderate activities, including; moving a table, pushing a vacuum cleaner, bowling, or playing golf. A predominant majority were limited to some degree by their health; fairly evenly split between being limited a little and being limited a lot (Table 6).

n = 93	Frequency	Percent
No, not limited at all	20	21.5
Yes, limited a little	37	39.8
Yes, limited a lot	36	38.7

Table 6. Your health now limits you to moderate activities

The second question asked if the participants were limited in climbing several flights of stairs. For the ninety-three participants who answered this question, a striking majority said they were limited a lot by their health in their ability to climb several flights of stairs (Table 7).

n = 93	Frequency	Percent
No, not limited at all	22	23.7
Yes, limited a little	28	30.1
Yes, limited a lot	43	46.2

Table 7. Your health now limits you from climbing several flights of stairs

In correlation with the above questions the participants were asked two additional questions regarding how much of the time they have had problems with their work or other regular daily activities in the past four weeks as a result of their physical health. First, they were asked to what degree they accomplished less because of their physical health. The answers made it apparent that the participants were at least affected some of the time (Table 8). Close to half were affected most of the time.

n = 93	Frequency	Percent
None of the time	13	14.1
A little of the time	18	19.6
Some of the time	23	25.0
Most of the time	27	29.3
All of the time	11	12.0

Table 8. Accomplished less than you would like

Similar results were found when the participants were asked how much they were limited in the kind of work or other activities they did because of their physical health (Table 9). Most of the participants were limited a little of the time, but there was still a large proportion that were affected most of the time and all of the time.

n = 93	Frequency	Percent
None of the time	15	16.1
A little of the time	19	20.4
Some of the time	23	24.7
Most of the time	23	24.7
All of the time	13	14.0

Table 9. Where limited in the kind of work or other activities

The participants were also asked how much of the time their physical health or emotional problems interfered with their social activities like visiting friends, relatives, etc. in the past 4 weeks. Most of the participants were unaffected. Those that were affected were only influenced a little of the time (Table 10). None of the participants were affected all the time.

n = 93	Frequency	Percent
None of the time	50	53.8
A little of the time	17	18.3
Some of the time	21	22.6
Most of the time	5	5.4
All of the time	0	0

Table 10. Interference of physical health or emotional problems

A majority of the participants in the program made it known that they were at least hampered some of the time because of their physical health. For some, their physical health had created an inconvenience that limited them from accomplishing some

of their tasks. The inability to complete tasks, such as visiting family members, is considered detrimental to one's health, and social well-being. Through participating in the arthritis foundation's aquatic classes twice a week on average, these burdens have been partially alleviated. Continued exercise outside of the arthritis foundation's aquatic classes has also proved to be beneficial.

What are the perceived benefits gained by the participants in the Arthritis Foundation's Aquatic Program?

The participants were asked three questions regarding how they felt and how things have been for them in the past 4 weeks. The first question asked the participants if they have felt calm and peaceful. The vast majority of the participants had felt this way either all the time or at least most of the time (Table 11).

n = 93	Frequency	Percent
None of the time	1	1.1
A little of the time	5	5.4
Some of the time	24	25.8
Most of the time	51	54.8
All of the time	12	12.9

Table 11. Have you felt calm and peaceful

The second question asked the participants if they have had a lot of energy. The results in this question were slightly lower than those found in the first question. However, most of the participants reported that they had a lot of energy at least some of the time (Table 12).

n = 93	Frequency	Percent
None of the time	8	8.6
A little of the time	18	19.4
Some of the time	38	40.9
Most of the time	26	28.0
All of the time	3	3.2

Table 12. Did you have a lot of energy

Lastly, the participants were asked about the way they felt, they were asked if they felt downhearted and depressed. Well over half of the participants said they felt this way just a little or none of the time (Table 13). Only one-person felt depressed all of the time.

n = 93	Frequency	Percent
None of the time	43	46.2
A little of the time	19	20.4
Some of the time	20	21.5
Most of the time	9	9.7
All of the time	2	2.2

Table 13. Have you felt downhearted and depressed

Given positive responses like this makes it is obvious why the participants in the Arthritis Foundation's Aquatic Program continue their participation. A vast majority of the participants reported that they have felt calm and relaxed, had lots of energy, and because of this have not felt downhearted or depressed. Through continued participation in the program, these benefits are strengthened.

What is the relationship between the longevity of participation and the attitudes and perceived benefits of the participants in the Arthritis Foundation's Aquatic Program?

Spearman correlations between length of time in the program and both perceived physical (SFP) and perceived mental (SFM) well-being of the participants in the Arthritis Foundation's Aquatic Program indicated no significant relationships (Spearman's rho SFP= .118, p=.259; SFM=.076, p=.469). The physical and mental benefits received from participating in the program did not form a linear relationship with the length of time of investment.

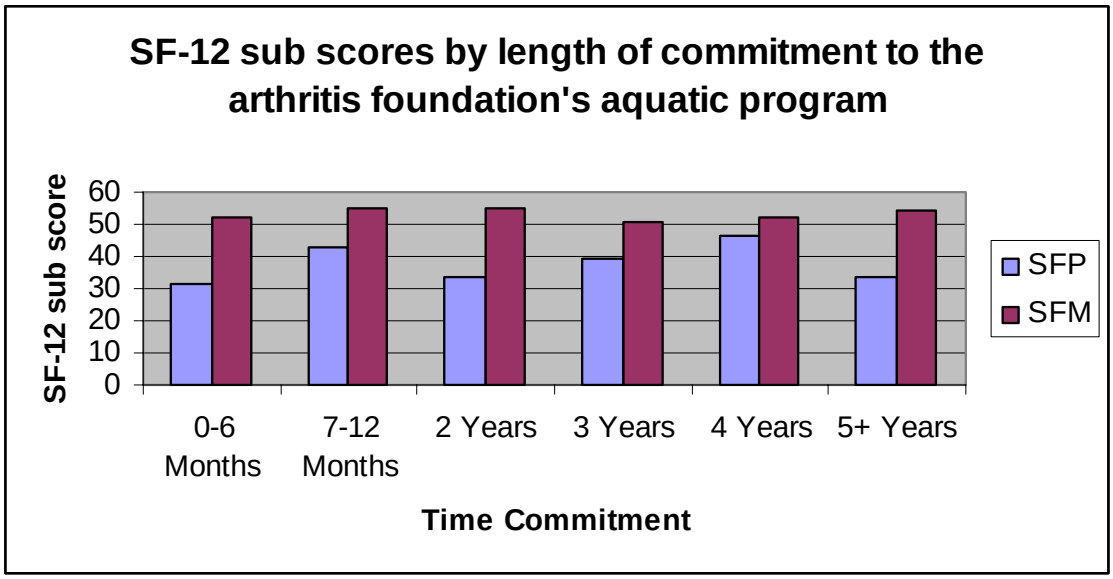
Additional Data Analysis

The researchers explored other possible connections between the participants' length of commitment to the Arthritis Foundation's Aquatic Program. An ANOVA was used to compare both physical health (SFP), and mental health (SFM) to the length of participation (Table 14). There were significant physical health sub scores for the length of commitment to the program. Subsequent post hoc analysis (Scheffe') indicated a significant difference in the physical health of those who have participated in the program for six or less months and those that have participated in the program for four years.

SF-12 sub scores by length of commitment to the Arthritis Foundation's Aquatic Program

	0-6 months	7-11 months	2 years	3 years	4 years	5+ years
SFP	31.6	42.7	33.8	39.0	46.2	33.3
SFM	52.0	54.9	55.2	50.5	52.1	53.0

Table 14. SFP F = 3.889; df = 92; p<.05 (.003)
SFM F = .491; df = 92; p>.05 (.782)



Discussion

Most of the participants in the Arthritis Foundation's Aquatic Program self-rated their health as being good. When they compared themselves to one of their peers, they considered their health to be at least normal. To help maintain their health status, the participants, on average, participated in the arthritis foundation's aquatic classes twice a week. The participants also participated in another form of exercise usually twice a week. Exercise and physical activity has continually attested to help improve life substantially.

Although there was not a relationship between longevity of participation and the attitudes and perceived benefits of the participants in the Arthritis Foundation's Aquatic Program, there were several plausible reasons for these findings. The benefits received from the Arthritis Foundation's Aquatic Program are immediate. The SF-12 was not designed to measure changes that occur so rapidly. To more readily analyze these changes, it would be recommended to compare these findings to a baseline of individuals who have not participated in the program.

In Burdine's study of the SF-12 as a population health measure, he found significant differences on the basis of six age categories (29). Those aged 65-75, and those 75+ were unique in that they had the lowest mean SFP (physical health) scores. Implicating these individuals typically scored the lowest in measures pertaining to physical health. Those who participated in this study were, on average, 70 years old. Burdine's findings proved true when an ANOVA was used for comparison because across the chart no matter the length of time of participation in the program, the participants' physical health was below average.

In this study, it was found that physical health played a large role in most of the participants' lives. Almost 50% of the participants were affected most of the time by their physical health. They were unable to complete or participate in all their daily activities. When it came to participating in other activities, physical health was a barrier to a lesser degree, but it still affected this population most of the time.

These types of effects may be related to the participants' current health status. The participants answered that they were limited to some degree by their current health. A majority were unable to do moderate activities like moving a table, pushing a vacuum cleaner, bowling, or playing golf. Most of the participants also answered that they had a significant amount of trouble climbing several flights of steps because of their current health status.

Affects like this may also be correlated to pain. In this study, it was found that pain was a moderate issue for most of the participants. Many of those who attended classes regularly made it known they were there to actively help manage their pain. Attributes of pain limited the amount of other activities the participants could perform.

While those that were older scored the lowest in physical health, the opposite was found with mental health. When an ANOVA was used, it was found that the participants scored higher than average no matter their length of time commitment to the program in regards to mental health. In Burdine's study, the ordering of the age groups in each subset was generally linear. The relationship to scores ranged from low to high, from oldest to youngest for SFP (physical health) scores, and youngest to oldest for SFM (mental health) scores.

From this study, it was found that the participants where only mildly affected by their emotional health. Those who were affected were only limited a little of the time and mildly accomplished less than they would ideally like. In general, the participants were not limited in the kind of work or activates they performed because of mental health. With age, mental health and stability increased.

An interesting find in this study was that the participant did not allow their mental or physical health to affect their relationships with others. This fact is important to note because programs like the Arthritis Foundation's Aquatic Program are very social. Many of the participants who attend classes regularly are highly socially engaged with the other participants in the class. It is because of these social relationships that the participants maintain consistent attendance in the classes.

The participants in the Arthritis Foundation's Aquatic Program classes are peers not only within the class, but also outside of the class. Knowing this, it is not unusual for the participants to answer the questions similarly. This fact detail could help explain why there was not a correlation between longevity of participation and mental or physical health.

The lack of a correlation between either mental health or physical health could have been due to the fact that those who participate in these types of activities already tend to perceive themselves as having relatively high physical and mental well-beings. Individuals who participate in this genre of activities are highly motivated and have the ability to self-stimulate.

Limitations

The methodology used to collect the data imposed limitations and required caution in interpreting the results. Since a survey research method was used, there were limitations to the validity of the study results because it was dependent on the respondent's ability to provide accurate answers to the questions on the survey. The survey approach may include bias against those who did not read English or who may feel threatened by health related survey activities. The net effect represents non-English speaking or low-literacy individuals.

Recommendations for Further Research

While this study provides an important overview of the mental and physical health of those currently enrolled the in the Arthritis Foundation's Aquatic Program in Franklin County, it also provides an important basis for future research. It would be beneficial to replicate this study using a baseline of individuals who have not participated before in the program. It would be beneficial to follow this population over time in a longitudinal study.

This study would be important to repeat in a larger population, such as across Ohio, or even as large as across the United States. It would be informative to see how physical and mental health differs across different geographic and cultural regions as well as to make comparisons from one region to another.

Several findings should be explored further, including why there was no correlation between length of participation and physical and mental health. What are the barriers keeping individuals who have arthritis from participating in activities like the Arthritis Foundation's Aquatic Program? Baseline assessment and follow-up might lend more insight into factors associated with those who persist with aquatic exercise vs. those who do not. Also, if mental health is not a factor keeping current participants enrolled, then what is the key factor keeping these individuals actively participating in the program?

The above are all important follow-up research questions that need to be addressed. If an organization like the arthritis foundation was to provide a seminar on how people can maintain their arthritis, would more individuals actively take a role in managing their arthritis? I would recommend for future research that someone explore

why those who are enrolled in the Arthritis Foundation's Aquatic Program initiated their participation.

Appendix A

CITI Course in The Protection of Human Research Subjects

Monday, June 26, 2006

CITI Course Completion Record for Kyle Dorsey

To whom it may concern:

On *6/23/2006*, *Kyle Dorsey* (username=dorseyk; Employee ID Number=03133064) completed all *CITI Program* requirements for the *Basic CITI* Course in The Protection of Human Research Subjects.

Learner Institution: *Ohio State University*

Learner Group: *Group 2.*

Learner Group Description: *Social and Behavioral Research Investigators and Staff.*

Contact Information:

Gender: Male
Department: Health Sciences
Which course do you plan to take?: Social & Behavioral Investigator Course Only
Role in human subjects research: Principal Investigator
Mailing Address:

Email:
Office Phone:

The Required Modules for *Group 2.* are:	**Date completed**
Introduction	06/07/06

History and Ethical Principles - SBR	06/07/06
Defining Research with Human Subjects - SBR	06/07/06
The Regulations and The Social and Behavioral Sciences - SBR	06/07/06
Assessing Risk in Social and Behavioral Sciences - SBR	06/23/06
Informed Consent - SBR	06/23/06
Privacy and Confidentiality - SBR	06/23/06
Research with Prisoners - SBR	06/23/06
Research with Children - SBR	06/23/06
Research in Public Elementary and Secondary Schools - SBR	06/23/06
International Research - SBR	06/23/06
Internet Research - SBR	06/23/06
HIPAA and Human Subjects Research	06/23/06
Ohio State University	06/23/06
Additional optional modules completed:	**Date completed**
Human Subjects Research at the VA	06/23/06
Workers as Research Subjects-A Vulnerable Population	06/23/06
Conflicts of Interest in Research Involving Human Subjects	06/23/06

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

CR# 293952

Appendix B

Arthritis Foundation Aquatic Program
Participant's Evaluation form

Pool Name: _____

Name of facility: _____ Date: _____

Please answer the following questions as completely as possible. Your honest answers will help the Arthritis Foundation continue to provide effective, successful programs. Thank you for your assistance.

1.) The following is true of the facility and instructions

	Always	Usually	Rarely	Never
• Class is started promptly……				
• The class is taught in a caring environment				
• The instructions are adequate for your needs				

2.) How long have you participated in the Arthritis Foundation Aquatic Program?

Two Months Or Less **3-6 Months** **7-11 Months** **1 Year** **2 Years** **3 Years** **4 Years** **5 Years Or More**

3.) On Average, how many times a week do you participate in the Arthritis Foundation Aquatic Program?

1 time a week Or Less **2 times a week** **3 times a week** **4 times a week** **5 times a week Or More**

4.) Not including the Arthritis foundation Aquatic Program, how many times a week do you exercise?

1 time a week Or Less **2 times a week** **3 times a week** **4 times a week** **5 times a week Or More**

5.) What suggestions do you have to improve the program?

_____

6.) Demographics

What is your Ethnicity

	African American
	Asian/Pacific Islander
	Hispanic
	White
	Native American
	Other

What is your annual family income

	Under $4,900
	$5,000 to $9,999
	$10,000 to $19,999
	$20,000 to $39,999
	$40,000 to $59,999
	More than $60,000

Indicate your zip code: _____

Gender: M / F

Age: _____

SF-12 v2 Health and Well-Being

For each of the following questions, please circle or X the best possible answer.

1.) In general, would you say your health is:

Excellent **Very Good** **Good** **Fair** **Poor**

2.) The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, Limited A Lot	**Yes, Limited A little**	**No, Not Limited At All**
•Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf			
•Climbing several flights of stairs			

3.) During the past 4 weeks, how much of the time have you had any of the following problems with your work of other regular daily activities as a result of your physical health?

	All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
•Accomplished less than you would like					
•Were limited in the kind of work or other activities					

4.) During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
•Accomplished less than you would like					
•Were limited in the kind of work or other activities					

5.) During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all **A little bit** **Moderately** **Quite a bit** **Extremely**

6.) These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks . . .

	All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
•Have you felt calm and peaceful?.					
•Did you have a lot of energy?					
•Have you felt downhearted and depressed?					

7.) During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time **Most of the time** **Some of the time** **A little of the time** **None of the time**

References

1. CDC. Prevalence of disabilities and associated health conditions among adults-United States, 1999. MMWR 2001;50:120-5
2. CDC. Projected prevalence of self-reported arthritis or chronic joint symptoms among person aged ≥65 years-United States, 2005-2030. MMWR 2003;52:489-91
3. Meenan, R. F., Callahan, L. F., & Helmick, C. G. (1999, January 6). The National Arthritis Action Plan: A public health strategy for looming epidemic. *Arthritis Care & Research, 12*(2), 79-81.
4. Centers of Disease Control and Prevention. Arthritis prevalence and activity limitations-United states, 1990. MMWR Morb Mortal Wkly Rep 1994;43:433-8
5. Dunlop D, Manheim L, Yelin E, Song J, Chang R. The costs of arthritis. *Arthritis Rheum* 2003; 49: 101-13.
6. Brady BJ, Kruger J, Helmick, CG, Callahan LF, Boutaugh ML,. (2003). Intervention Programs for Arthritis and Other Rheumatic Diseases. *Health Education & Behavior*, *30*(1), 44.
7. Neuberger GB, Kasal S, Smith KV, Hassanein R, Deviney S: Determinants of exercise and aerobic fitness in outpatients with arthritis. *Nurs Res* 43:11-17, 1994.
8. Centers of Disease Control and Prevention. Health-related quality of life among adults with arthritis-Behavior Risk Factor Surveillance System, 11 states, 1996-1998. MMWR Morb Mortal Wkly Rep 2000;49:366-9.
9. Centers of Disease Control and Prevention: Prevalence and impact of arthritis among women in the United States, 1989-1991.MMWR *Morb Mortal Wkly Rep* 44:329-334,517-518, 1995.
10. Yelin EH, Felts WR. A summary of the impacts of musculoskeletal conditions in the Untied States. Arthritis Rheum 1990;33:750-5.
11. Centers of Disease control and Prevention. Prevalence of Doctor-Diagnosed Arthritis and Possible Arthritis- 30 States, 2002]. MMWR 2004; 553[383-406].
12. Centers of Disease Control and Prevention: Arthritis prevalence and activity limitations, United States, 1990. MMWR Morbid Mortal Wkly Rep 1994;43:433-8.
13. Hoffman DF. Arthritis and exercise. Primary Care 1993 Ded:20(4):895-910.
14. Berkman, L.F., Berkman, C.S., Kasl, S., Freeman, D.H., Leo, L., Ostield, A.M., Coroni-Huntly, J. and Brody, J. A. (1986) Depressive symptoms in relation to physical health and functioning in the elderly. *American Journal of epidemiology* 124, 372-388
15. Penninx, B. W. J. H., Tilburg, T. V., Deeg, D. J., Kriegsman, D. M., Boeke, A. J. P., & Van Eijk, J. T. (1997). Direct and Buffer Effects of Social Support and Personal Coping Resources in Individuals with Arthritis. *Social Science and Medicine, 44*(3), 393-402.
16. Minor MA. Physical activity and management of arthritis. Ann Behav Med 1991;13:117-24.
17. Arthritis Foundation: *Arthritis Foundation Aquatics Exercise Program Evaluation*. Atlanta, GA, Arthritis Foundation, 1987.

18. Fries JF, Carey C, McShane DF: Patient education in arthritis: Randomized control trial of a mail-delivered program. *J Rheumatol* 24: 1378-1383, 1997.
19. Patrick DL, Ramsey SD, Spencer AC, Kinne S, Belza B, Topolski T: Economic evaluation of aquatic exercise for persons with osteoarthritis. *Med Care* 39:409-412, 2001.
20. Boutaugh ML. Arthritis Foundation Community-Based Physical Activity Programs: Effectiveness and Implementation Issues. *Arthritis Rheum (Arthritis Care Res)* 2003; 49: 463-70.
21. Suomi R, Lindauer S. Effectiveness of the Arthritis Foundation Aquatic Program on strength and range of motion in women with arthritis. J Aging Phys Activ 1997;5:341-51
22. Schoster B. Callahan LF, Meier A, Mielenz T. Dimartino L. The People with Arthritis Can Exercise (PACE) program; a qualitative evaluation of participant satisfaction. Prev Chronic Dis [serial online] 2005 Jul.
23. Rejeski, W., & Mihalko, S. (2001). Physical activity and quality of life in older adults. *Journals of Gerontology: Series A: Biological Sciences and Medical Sciences, 56 Spec No 2*, 23-35.
24. Orlich, D.C. (1978). Designing Sensible Surveys. Redgrave Publishing Co.; Pleasantville, NY.\
25. Gay, L. R. (1987). *Educational Research* (Third Ed.). Columbus, OH: Merrill Publishing Company. (Original work published 1976)
26. Ary, D., Jacobs, L. C., & Razavieh, A. (1990). *Introduction to Research in Education* (4th Ed.). Orlando, FL: Ted Buchholz. (Original work published 1972)
27. Fraenkel, J. R., & Wallen, N. E. (1993). *How to Design and Evaluate Research in Education* (2nd Ed.). McGraw-Hill, Inc. (Original work published 1990)
28. DePoy, E., & Gitlin, L. N. (1998). *Introduction to Research.* John Schrefer.
29. Burdine JN, Fleix MRJ, Able AL, Wiltraut CJ, Musselman YJ. The SF-12 as a population health measure: An exploratory examination of potential for application. *Health Services Research.* 2000;35:885–904.